201-14907

I U C L I D

Data Set

Existing Chemical	:	ID: 111-97-7
CAS No.	:	111-97-7
Producer related part		
Company	:	The Thioesters Association
Creation date	:	30.04.2003
Substance related part		
Company	:	The Thioesters Association
Creation date	:	30.04.2003
Status	:	
Memo	:	
Printing date	:	25.11.2003
Revision date	:	25.11.2003
Date of last update	:	25.11.2003
Number of pages	:	27
Chapter (profile)	:	Chapter: 1, 2, 3, 4, 5, 6, 7, 8, 10
Reliability (profile)	:	Reliability: without reliability, 1, 2, 3, 4
Flags (profile)	:	Flags: without flag, confidential, non confidential, WGK (DE), TA-Luft (DE), Material Safety Dataset, Risk Assessment, Directive 67/548/EEC, SIDS

1.0.1 APPLICANT AND COMPANY INFORMATION

1.0.2 LOCATION OF PRODUCTION SITE, IMPORTER OR FORMULATOR

1.0.3 IDENTITY OF RECIPIENTS

1.0.4 DETAILS ON CATEGORY/TEMPLATE

1.1.0 SUBSTANCE IDENTIFICATION

1.1.1 GENERAL SUBSTANCE INFORMATION

Purity type :
Substance type : organic
Physical status : solid
Purity : = 96.5 % w/w
Colour :
Odour :

Reliability : (2) valid with restrictions

(2)

Purity type :
Substance type : organic
Physical status : solid
Purity : > 99 % w/w
Colour :
Odour :

Remark : Since the melting point is about 25-29 degrees C, the substance may be a liquid, or only partially solid at ambient temperature.
Reliability : (2) valid with restrictions

(10)

1.1.2 SPECTRA

1.2 SYNONYMS AND TRADENAMES

3,3'-Thiodipropionitrile

(9)

Propionitrile, 3,3'-thiodi

(9)

Sulfide, bis(2-cyanoethyl)

(9)

Thiodipropionitrile

(9)

1.3 IMPURITIES

Purity :
CAS-No : 111-17-1
EC-No : 203-841-3
EINECS-Name : 3,3'-thiodi(propionic acid)
Molecular formula :
Value : <= 1 % w/w

Reliability : (2) valid with restrictions

(10)

Purity :
CAS-No : 107-96-0
EC-No : 203-537-0
EINECS-Name : 3-mercaptopropionic acid
Molecular formula :
Value : <= 1 % w/w

Reliability : (2) valid with restrictions

(10)

Purity :
CAS-No : 1119-62-6
EC-No : 214-284-0
EINECS-Name : 3,3'-dithiobispropionic acid
Molecular formula :
Value : <= 1 % w/w

Reliability : (2) valid with restrictions

(10)

Purity :
CAS-No : 7732-18-5
EC-No : 231-791-2
EINECS-Name : Water
Molecular formula :
Value : <= 3.5 % w/w

Reliability : (2) valid with restrictions

(10)

Purity :
CAS-No : 107-13-1
EC-No : 203-466-5
EINECS-Name : acrylonitrile
Molecular formula :
Value : <= 1 % w/w

Reliability : (2) valid with restrictions

(10)

Purity :
CAS-No :

EC-No	:	
EINECS-Name	:	dithiopropionitrile
Molecular formula	:	
Value	:	<= 1 % w/w
Reliability	:	(2) valid with restrictions

(10)

Purity	:	
CAS-No	:	
EC-No	:	
EINECS-Name	:	mercaptopropionitrile
Molecular formula	:	
Value	:	<= 1 % w/w
Reliability	:	(2) valid with restrictions

(10)

1.4 ADDITIVES

Remark	:	No intentional additives per the reference.
Reliability	:	(1) valid without restriction

(10)

1.5 TOTAL QUANTITY

1.6.1 LABELLING

1.6.2 CLASSIFICATION

1.6.3 PACKAGING

1.7 USE PATTERN

Type of use	:	industrial
Category	:	Chemical industry: used in synthesis
Remark	:	According to the manufacturers, Cytec Industries, Inc. and The Dow Chemical Company, thiodipropionitrile is used solely as a closed system industrial intermediate that is site limited.
Source	:	Cytec Industries, Inc.
Reliability	:	(2) valid with restrictions

1.7.1 DETAILED USE PATTERN

1.7.2 METHODS OF MANUFACTURE

1.8 REGULATORY MEASURES

1.8.1 OCCUPATIONAL EXPOSURE LIMIT VALUES

Remark : No established exposure limit known.
Reliability : (2) valid with restrictions

(2)

1.8.2 ACCEPTABLE RESIDUES LEVELS

1.8.3 WATER POLLUTION

1.8.4 MAJOR ACCIDENT HAZARDS

1.8.5 AIR POLLUTION

1.8.6 LISTINGS E.G. CHEMICAL INVENTORIES

1.9.1 DEGRADATION/TRANSFORMATION PRODUCTS

1.9.2 COMPONENTS

1.10 SOURCE OF EXPOSURE

1.11 ADDITIONAL REMARKS

1.12 LAST LITERATURE SEARCH

1.13 REVIEWS

2.1 MELTING POINT

Value	:	= 25 - 29 °C
Sublimation	:	
Method	:	OECD Guideline 102
Year	:	2003
GLP	:	yes
Test substance	:	as prescribed by 1.1 - 1.4
Result	:	In both studies, the melting point range was 298 to 302 +/- 0.5 degrees K. There was approximately 1 degree K difference in the onset of melting (meniscus formation) for the two determinations (298 and 299 degrees K, respectively). It was completely melted (a clear liquid) at 302 degrees K in both studies . The test material was a white solid at 294 degrees K in the first study, and 292 degrees K in the second.
Test condition	:	A fused capillary tube (80 – 100 mm long, 1.0 +/- 0.2 mm diameter) was filled with test material to a level of 3 mm. The filled tube was then placed in a freezer to solidify the material. The capillary tube was inserted into a liquid bath containing ice, water and acetone through a side port in the melting point apparatus. Two thermometers were inserted at the top of the apparatus through a 2 -hole stopper. One (thermometer 1) was inserted down into the bath and the other (thermometer 2) was positioned above the bath, at the level of mercury in the other thermometer. Thermometer 2 measured the temperature of the atmosphere at the emergent stem The end of the capillary tube was positioned against the bulb of thermometer 1. The bath was heated with an electric heating mantle at a rate of 1 degree K/min. The bath was stirred constantly with a magnetic stir bar. Temperatures of the bath and atmosphere were recorded, along with any observations about the appearance of the test material. The procedure was performed in duplicate. The temperature readings were corrected using the following equation: Corrected temperature (K) = temperature of the bath (K) + 0.00016 x [temperature of the bath – temperature of the emergent stem (from thermometer 2)] x number of gradations of mercury thread of thermometer 1 at the emergent stem.
Test substance	:	Purity of the test material was not determined in the study. It was used as supplied by Cytec Industries, Inc. It is assumed that it was of the same purity as material described in the current MSDS (96.5%).
Reliability	:	(1) valid without restriction Test was conducted according to an established guideline.
Flag	:	Critical study for SIDS endpoint

(1)

Value	:	= 25 °C
Sublimation	:	
Method	:	other
Year	:	
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	No details for method of melting point determination, however this melting point value is in good agreement with the 25 - 29 degrees C value reported above.
Reliability	:	(2) valid with restrictions

Data came from a MSDS.

Flag : Material Safety Dataset

(2)

2.2 BOILING POINT

Value : = 163 - 164 °C at
Decomposition :
Method : other
Year :
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Reliability : (2) valid with restrictions
Experimental details were not provided. Data came from a MSDS.
Flag : Critical study for SIDS endpoint

(10)

2.3 DENSITY

Type : relative density
Value : = 1.11 at °C
Method : other
Year :
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Reliability : (2) valid with restrictions
Experimental details were not provided.
Flag : Material Safety Dataset

(2)

2.3.1 GRANULOMETRY

2.4 VAPOUR PRESSURE

Value : = 7.3 x 10 E-5 hPa at 25 °C
Decomposition :
Method : OECD Guideline 104
Year : 2003
GLP : yes
Test substance : as prescribed by 1.1 - 1.4

Result : The equations fit to the log10Vp (Pa) vs. 1/temperature (degrees K) for the six runs were as follows: (1) log10Vp (Pa) = -4093.322/temp (K) + 11.597; (2) log10Vp (Pa) = -4201.011/temp (K) + 11.922; (3) log10Vp (Pa) = -4104.380/temp (K) + 11.364; (4) log10Vp (Pa) = -4009.591/temp (K) + 11.343; (5) log10Vp (Pa) = -4329.233/temp (K) + 12.302; (6) log10Vp (Pa) = -3827.006/temp (K) + 10.781. The corresponding log10Vp (Pa) values at 298.15 degrees K (25 degrees C) were -2.132, -2.168, -2.133, -2.105, -2.219, and -2.054. The average log10Vp (Pa) of -2.135 is equal to a vapor pressure of 7.3 E-3 Pa.

Test condition : The vapor pressure was determined using a vapor pressure balance. After evacuating the system, opening the shutter above the sample oven caused

the escaping vapor jet to be directed at the scale pan. The difference in mass readings with the orifice covered and uncovered is proportional to the vapor pressure at the oven temperature. The temperature of the sample was controlled electronically. The mass and temperature readings were recorded automatically into a computer file.

A sequence of 6 runs was started after a sample of test material had been under vacuum for approximately 6 hours. Temperature and pressure readings were taken between 52 and 62 degrees C with a one hour period at 52 degrees C between runs.

The vapor pressure (Vp) was calculated according to the following equation:

Vp (Pa) = mass difference (kg) x 9.813 m/s E-2 (acceleration due to gravity) / 7.06858 x 10E-6 mE2 (area of the orifice).

A plot of log10 Vp (Pa) versus the reciprocal temperature (degrees K) was made, which resulted in a straight line gr aph. The vapor pressure at 298.15 degrees K was extrapolated from the graph.

Test substance : Purity of the test material was not determined in the study. It was used as supplied by Cytec Industries, Inc. It is assumed that it was of the same purity as material described in the current MSDS (96.5%).

Reliability : (1) valid without restriction
Test was conducted according to an established guideline.

Flag : Critical study for SIDS endpoint

(11)

Value : = .03 hPa at 25 °C
Decomposition :
Method : other (calculated)
Year : 2003
GLP : No
Test substance : as prescribed by 1.1 - 1.4

Remark : Measured inputs to the model are melting point (27 degrees C), boiling point (163-164 degrees C at 1 mm Hg extrapolated to 250 degrees C at 1013 hPa), and water solubility (25,000 mg/l at 30 degrees C).

Reliability : (2) valid with restrictions
Data were obtained by modeling.

Flag : Critical study for SIDS endpoint

(7)

2.5 PARTITION COEFFICIENT

Partition coefficient :
Log pow : = -.05 at 20 °C
pH value :
Method : other (calculated)
Year : 2003
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Remark : Measured inputs to the model are melting point (27 degrees C), boiling point (163-164 degrees C at 1 mm Hg extrapolated to 250 degrees C at 1013 hPa), vapor pressure (5.5 E-5 mm Hg), and water solubility (25,000 mg/l at 30 degrees C).

Reliability : (2) valid with restrictions

Data were obtained by modeling.

Flag : Critical study for SIDS endpoint

(6)

2.6.1 SOLUBILITY IN DIFFERENT MEDIA

Solubility in : water
Value : ca. 25000 mg/l at 30 °C
pH value :
concentration : at °C
Temperature effects :
Examine different pol. :
pKa : at 25 °C
Description :
Stable :
Deg. product :
Method : other
Year :
GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Reliability : (2) valid with restrictions
No experimental details were given. Data came from a MSDS.
Flag : Critical study for SIDS endpoint

(2)

Solubility in : water
Value : ca. 117,900 mg/l at 25 °C
pH value :
concentration : at °C
Temperature effects :
Examine different pol. :
pKa : at 25 °C
Description :
Stable :
Deg. product :
Method : other: calculated using EPIWIN Wskow (v1.40)
Year : 2003
GLP : no
Test substance : as prescribed by 1.1 - 1.4

Remark : Measured inputs to the model are melting point (27 degrees C), boiling point (163-164 degrees C at 1 mm Hg extrapolated to 250 degrees C at 1013 hPa), vapor pressure (5.5 E-5 mm Hg), and water solubility (25,000 mg/l at 30 degrees C).
Reliability : (2) valid with restrictions
Data were obtained by modeling.

(8)

2.6.2 SURFACE TENSION

2.7 FLASH POINT

Value : = 80 °C
Type : closed cup
Method : other
Year :

GLP : no data
Test substance : as prescribed by 1.1 - 1.4

Reliability : (2) valid with restrictions
Experimental details were not provided. Data came from a MSDS.

(2)

2.8 AUTO FLAMMABILITY

2.9 FLAMMABILITY

2.10 EXPLOSIVE PROPERTIES

2.11 OXIDIZING PROPERTIES

2.12 DISSOCIATION CONSTANT

2.13 VISCOSITY

2.14 ADDITIONAL REMARKS

3.1.1 PHOTODEGRADATION

Type	:	air
Light source	:	
Light spectrum	:	nm
Relative intensity	:	based on intensity of sunlight
INDIRECT PHOTOLYSIS		
Sensitizer	:	OH
Conc. of sensitizer	:	
Rate constant	:	= .000000000003885 cm^3/(molecule*sec)
Degradation	:	= 50 % after 33 hour(s)
Deg. product	:	
Method	:	other (calculated)
Year	:	2003
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Measured inputs to the model are melting point (27 degrees C), boiling point (163-164 degrees C at 1 mm Hg extrapolated to 250 degrees C at 1013 hPa), vapor pressure (5.5 E-5 mm Hg), and water solubility (25,000 mg/l at 30 degrees C).
Reliability	:	(2) valid with restrictions Data were obtained by modeling.
Flag	:	Critical study for SIDS endpoint

(3)

3.1.2 STABILITY IN WATER

Type	:	abiotic
t1/2 pH4	:	> 1 year at 25 degree C
t1/2 pH7	:	> 1 year at 25 degree C
t1/2 pH9	:	> 1 year at 25 degree C
Deg. Product	:	no
Method	:	OECD Guide-line 111
Year	:	2003
GLP	:	yes
Test substance	:	as prescribed by 1.1 – 1.4
Result	:	After incubation for 5 days at 50 degrees C and pH 4, 7 and 9, 91.0%, 98.1% and 99.3% of the material remained, respectively. Less than 10% hydrolysis was observed at all conditions (which corresponded to a half life of > 1 year at 25 degrees C). The investigation at pH 1.4 and 37 degrees C was performed to simulate the hydrolysis of the test material in the human stomach. After 5 days at pH 1.4 and 37 degrees C, 97.2% of the initial test material remained.
Test Condition	:	The buffer solutions were filtered through a 0.2 micrometer membrane to ensure sterility before starting the test. The solutions were subjected to ultrasonication and degassing with nitrogen to minimize dissolved oxygen content, and then (with the exception of the pH 1.2 run) pre-equilibrated to test temperature prior to use. Sample solutions were prepared in stoppered glass flasks at a nominal concentration of 1.0 g/l in the buffer solutions. The solutions were shielded from light while maintained at the test temperature. Initial testing was conducted with sample solutions at pH 4, 7 and 9, maintained at temperatures of 50.0 ± 0.5 degrees C for 5 days. Further testing was undertaken at physiological pH and temperature (1.4 and 37.0 ±

0.5 degrees C, respectively) for a period of 5 days. Aliquots of the sample solutions were taken from the flasks at various times and the pH of each solution recorded.

The concentration of the sample solution was determined by high performance liquid chromatography (HPLC). Duplicate aliquots of sample solution were diluted by a factor of 10 with water and acetonitrile to give a final matrix of buffer:water:acetonitrile of 10:40:50 (v/v/v). Duplicate standard solutions of test material were prepared in the matrix at a nominal concentration of 100 mg/l.

An aliquot (20 microliters) of each sample solution or standard was injected onto a Develosil RP Aqueous column (250 x 4.6 mm id). The column temperature was 40 degrees C. The mobile phase was acetonitrile/water (25:75 v/v), and the flow rate was 1.0 ml/min. The UV detector wavelength was 205 nm.

The mean peak area of each standard was corrected to a nominal concentration of 100 mg/l and the mean value taken. The concentration of the sample solutions (g/l) was calculated using the following equation:

$$C_{spl} = (P_{spl}/P_{std}) \times C_{std} \times D \times 1/1000$$

where:

C_{spl} = sample concentration (g/l)
P_{spl} = mean peak area (or height) of sample solution
P_{std} = mean peak area of standard solution, corrected to nominal standard concentration
C_{std} = nominal standard concentration (100 mg/l)
D = sample dilution factor (0.04)

The rate constant was not calculated due to the lack of degradation. The method of determining the half-life was not stated.

The linearity of the detector response in respect to concentration was assessed over the nominal concentration range of 0 to 200 mg/l. This was satisfactory, with a correlation coefficient of 1.000 being obtained.

Test substance : Purity of the test material was not determined in the study. It was used as supplied by Cytec Industries, Inc. It is assumed that it was of the same purity as material described in the current MSDS (96.5%).

Conclusion : The material is stable for 5 days at pH 4, 7 and 9 at 50 degrees C and at pH 1.4 and 37 degrees C.

Reliability : (1) valid without restriction
Study was conducted according to an OECD guideline, using GLP.

Flag : Critical study for SIDS endpoint.

(1)

3.1.3 STABILITY IN SOIL

3.2.1 MONITORING DATA

3.2.2 FIELD STUDIES

3.3.1 TRANSPORT BETWEEN ENVIRONMENTAL COMPARTMENTS

Type	:	fugacity model level III
Media	:	water – air
Air	:	0.00709 % (Fugacity Model Level I)
Water	:	49.3 % (Fugacity Model Level I)
Soil	:	50.6 % (Fugacity Model Level I)
Biota	:	0.0917 % (Fugacity Model Level II/III)
Soil	:	% (Fugacity Model Level II/III)
Method	:	other
Year	:	2003
Remark	:	Measured inputs to the model are melting point (27 degrees C), boiling point (163-164 degrees C at 1 mm Hg extrapolated to 250 degrees C at 1013 hPa), vapor pressure (5.5 E-5 mm Hg), and water solubility (25,000 mg/l at 30 degrees C). Emission rates inputted into the program were air: 0 kg/hr, water: 1000 kg/hr, soil: 1000 kg/hr and sediment: 0 kg/hour. Half-lives in various media are air: 66.07 hours; water: 900 hours; soil: 900 hours; and sediment: 3600 hours. Ultimate biodegradation is estimated roughly at weeks to months. The Henry's Law Constant [calculated by EPIWIN Henry (v3.10)] is 2.38 E-10 atm-m3/mol (bond est.). The soil-sediment coefficient [calculated by EPIWIN PCKOC (v1.66)] is Koc = 177.1.
Reliability	:	(2) valid with restrictions Data were obtained by modeling.
Flag	:	Critical study for SIDS endpoint

(5)

3.3.2 DISTRIBUTION

3.4 MODE OF DEGRADATION IN ACTUAL USE

3.5 BIODEGRADATION

3.6 BOD5, COD OR BOD5/COD RATIO

3.7 BIOACCUMULATION

3.8 ADDITIONAL REMARKS

4.1 ACUTE/PROLONGED TOXICITY TO FISH

Type	:	other
Species	:	
Exposure period	:	96 hour(s)
Unit	:	mg/l
LC50	:	= 8785.377 calculated
Method	:	other
Year	:	2003
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Measured inputs to the model are melting point (27 degrees C), boiling point (163-164 degrees C at 1 mm Hg extrapolated to 250 degrees C at 1013 hPa), vapor pressure (5.5 E-5 mm Hg), and water solubility (25,000 mg/l at 30 degrees C). The EPIWIN ECOSAR model used was neutral organic compound.
Reliability	:	(2) valid with restrictions Data were obtained by modeling.
Flag	:	Critical study for SIDS endpoint

(4)

4.2 ACUTE TOXICITY TO AQUATIC INVERTEBRATES

Type	:	other
Species	:	Daphnia magna (Crustacea)
Exposure period	:	48 hour(s)
Unit	:	mg/l
EC50	:	= 8170.722 calculated
Method	:	other
Year	:	2003
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Measured inputs to the model are melting point (27 degrees C), boiling point (163-164 degrees C at 1 mm Hg extrapolated to 250 degrees C at 1013 hPa), vapor pressure (5.5 E-5 mm Hg), and water solubility (25,000 mg/l at 30 degrees C). The EPIWIN ECOSAR model used was neutral organic compound.
Reliability	:	(2) valid with restrictions Data were obtained by modeling.
Flag	:	Critical study for SIDS endpoint

(4)

4.3 TOXICITY TO AQUATIC PLANTS E.G. ALGAE

Species	:	other algae: green algae
Endpoint	:	biomass
Exposure period	:	96 hour(s)
Unit	:	mg/l
EC50	:	= 4539.524 calculated
Method	:	other
Year	:	2003
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Remark	:	Measured inputs to the model are melting point (27 degrees C), boiling point (163-164 degrees C at 1 mm Hg extrapolated to 250 degrees C at 1013 hPa), vapor pressure (5.5 E-5 mm Hg), and water solubility (25,000 mg/l at 30 degrees C). The EPIWIN ECOSAR model used was neutral organic compound.
Reliability	:	(2) valid with restrictions Data were obtained by modeling.
Flag	:	Critical study for SIDS endpoint

(4)

4.4 TOXICITY TO MICROORGANISMS E.G. BACTERIA

4.5.1 CHRONIC TOXICITY TO FISH

4.5.2 CHRONIC TOXICITY TO AQUATIC INVERTEBRATES

4.6.1 TOXICITY TO SEDIMENT DWELLING ORGANISMS

4.6.2 TOXICITY TO TERRESTRIAL PLANTS

4.6.3 TOXICITY TO SOIL DWELLING ORGANISMS

4.6.4 TOX. TO OTHER NON MAMM. TERR. SPECIES

4.7 BIOLOGICAL EFFECTS MONITORING

4.8 BIOTRANSFORMATION AND KINETICS

4.9 ADDITIONAL REMARKS

5.0 TOXICOKINETICS, METABOLISM AND DISTRIBUTION

5.1.1 ACUTE ORAL TOXICITY

Type	:	LD50
Value	:	= 3750 mg/kg bw
Species	:	mouse
Strain	:	other:albino
Sex	:	male
Number of animals	:	39
Vehicle	:	
Doses	:	3.0, 4.0 and 5.0 ml/kg
Method	:	other
Year	:	1953
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Result	:	Very shortly after administration, squinting, lacrimation, rapid and labored respiration, ataxia and depression were noted, with vasodilation around the mouth, mild clonic convulsions and coma preceding death. Six animals treated with 3.38 mg/kg, seven treated with 4.44 mg/kg, and all animals treated with 5.55 mg/kg died during the study. All mid and high dose animals and 4/6 low dose animals that died succumbed within 24 hours. At 24 hours, some of the survivors were depressed but otherwise appeared normal. Postmortem examinations of mice that died revealed hemorrhagic or hyperemic lungs, distended stomachs, irritated intestines (with vasodilation in some cases), mottled livers and granular kidneys. In addition, blood clots were observed in the region of the transverse sinuses of 2 mice treated with 4.4 g/kg. No other brain damage was observed grossly. Animals that survived until necropsy had normal gross pathology. The LD50 values (with error limits) calculated for 48 hours and 10 days were 4.10 (2.73 - 6.15) and 3.75 (2.63 - 5.34) g/kg, respectively. The slopes of the curves for these time points were 1.361 and 2.217, respectively.
Test condition	:	Test material was administered by stomach tube at 3.0, 4.0 and 5.0 ml/kg to 3 groups of 13 rats each. Weights of the animals were not listed. Using a specific gravity of 1.1095, the values in g/kg were 3.38, 4.44 and 5.55. Animals were observed over a 10-day period for mortality or signs of toxicity. LD50 values at 48 hours and 10 days were calculated using the Wilcoxon and Litchfield method.
Test substance	:	The purity was listed as > = 90%.
Reliability	:	(1) valid without restriction The study conduct was similar to a guideline study.
Flag	:	Critical study for SIDS endpoint

(12)

5.1.2 ACUTE INHALATION TOXICITY

Type	:	LC50
Value	:	> 15.5 ppm
Species	:	other: mouse, rat, guinea pig
Strain	:	
Sex	:	no data

Number of animals	:	
Vehicle	:	
Doses	:	15.5 ppm
Exposure time	:	6 hour(s)
Method	:	other
Year	:	1953
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Result	:	The final concentration of test material in the chamber was 15.5 ppm. None of the animals died or exhibited signs of toxicity during exposure. After exposure, viscera were in their normal position and were normal in appearance and consistency. Vascular congestion was found throughout all tissues; however, since this also was found in normal controls, it was not due to treatment. There were no other significant microscopic findings.
Test condition	:	Seven mice (avg. wt. 30 g), 7 rats (avg. weight 297 g), 7 guinea pigs (avg. et. 457 g) were exposed in a 160 liter stainless steel chamber to a near-saturated vapor of test material for 6 hours. The air flow was maintained at 35 lpm. Vapor was generated by bubbling the air through the test material which was maintained at 36 degrees C. The concentration of test material in the chamber was determined by a modification of the Kjeldahl analysis for nitrogen. A known sample of the chamber atmosphere was drawn through 2 bubblers (in tandem) containing distilled water. An aliquot was analyzed for the total nitrogen content by the Kjeldahl method. Samples were also analyzed from chambers containing the same animals during exposure to air only to determine the background level of nitrogen. Known quantities of test material were also analyzed to determine the percent recovery of nitrogen from the test material. Animals were killed and examined grossly and microscopically after exposure.
Test substance	:	The purity was listed as > = 90%.
Reliability	:	(1) valid without restriction The study conduct was similar to a guideline study.
Flag	:	Critical study for SIDS endpoint

(13)

5.1.3 ACUTE DERMAL TOXICITY

Type	:	LD50
Value	:	> 8 ml/kg bw
Species	:	rabbit
Strain	:	other: albino
Sex	:	no data
Number of animals	:	9
Vehicle	:	
Doses	:	8.0 ml/kg
Method	:	other
Year	:	1953
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	The cause of death in one high dose animal appeared to be a parasitic infection.
Result	:	None of the low or mid dose animals died before scheduled termination. Animals exposed to 1.0 ml/kg appeared depressed shortly after the material was applied but had normal behavior at 24 hours. There were no other signs of systemic toxicity or skin irritation, and weight gains were normal over the course of the study. Animals exposed to 4.0 ml/kg were observed to be hopping about in their cages shortly after application, which was indicative of burning or pain. Animals appeared normal within 24 hours. There were no other signs of toxicity in this group. Autopsies of low

and mid-dose animals were normal.

One high dose animal died on the 4th day after application. This animal had experienced diarrhea (accompanied by weight loss) on day 2. At autopsy, this animal and another high dose animal that also experienced diarrhea and weight loss on day 2 but survived to study termination had a parasitic infestation of the liver, hyperemic lungs, and intestinal irritation. One of these animals also had mottled kidneys (it was not noted if this occurred in the animal that survived or in the one that died before scheduled termination). The third high dose animal also had diarrhea accompanied by weight loss on day 4, but did not have any significant findings upon gross necropsy.

The LD50 value was greater than the highest dose given (8.0 ml/kg). Based on a specific gravity of 1.1095, this value is 8.876 g/kg.

Test condition : Three groups of 3 albino rabbits (weights and sex were not indicated) received a single dermal application of undiluted test material at doses of 1.0, 4.0 and 8.0 ml/kg. The abdomens of low dose animals and the entire trunks of the mid and high dose animals were closely shaved prior to application of the test material. The material was applied under rubber damming. Mid and high dose animals were restrained in racks while the material was applied a little at a time to prevent leakage. Some loss from leakage was observed in the high dose group due to the large amount of material that was applied. The trunks of all animals were wrapped in gauze secured with adhesive tape to prevent ingestion. Dressings were removed after the material had been in contact with the skin for approximately 22 hours. Animals were then evaluated for dermal irritation and systemic toxicity. Additional observations were made daily thereafter for a period of 6-10 days. The animals were euthanized by air embolism and gross necropsies were performed.

Test substance : The purity was listed as > = 90%.

Reliability : (2) valid with restrictions
The results may have been influenced by the presence of a parasitic infection.

Flag : Critical study for SIDS endpoint

(12)

5.1.4 ACUTE TOXICITY, OTHER ROUTES

5.2.1 SKIN IRRITATION

Species	:	rabbit
Concentration	:	1 other: ml/kg
Exposure	:	Occlusive
Exposure time	:	10 day(s)
Number of animals	:	6
Vehicle	:	
PDII	:	
Result	:	
Classification	:	not irritating
Method	:	other
Year	:	1953
GLP	:	no data
Test substance	:	as prescribed by 1.1 - 1.4

Result : No skin irritation was noted after 10 days of application of the material.

Test condition : Six rabbits (sex and weight were not listed) were treated dermally on clipped abdominal skin with 1.0 ml/kg test material, 5 days/week, 22

hours/day, for a total of 10 applications. The material was applied under rubber damming and gauze binders were placed around the abdomens to hold the damming in place. Each day, after 22 hours of treatment, the dressings were removed and the animals were observed for systemic toxicity and skin irritation. Animals were then observed for toxicity for 10 additional days.

Test substance : The purity was listed as > = 90%.

Reliability : (2) valid with restrictions
The degree of irritation observed was not given a numerical score. However, since the material did not appear to cause irritation in any of the animals, this is not a serious drawback to the study.

(13)

5.2.2 EYE IRRITATION

Species	:	rabbit
Concentration	:	undiluted
Dose	:	.05 ml
Exposure time	:	
Comment	:	
Number of animals	:	3
Vehicle	:	
Result	:	slightly irritating
Classification	:	
Method	:	other
Year	:	1953
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4

Result : Blinking and scrambling indicative of pain, vascularization of the sclera and nictitating membrane and some edema of the upper eyelid were noted immediately after application. A mild erythema also was observed in 2/3 rabbits. All eyes appeared normal after 1 hour. There was no evidence of systemic toxicity during the experiment.

Test condition : Test material (0.5 ml) was applied undiluted into the conjunctival sac of the left eye of each of 3 albino rabbits (weight and sex was not indicated). The eye was closed for approximately 30 seconds, after which an evaluation was taken. Additional observations were made 1, 4 and 24 hours after application, and daily thereafter for 1 week. The untreated right eyes served as controls. The animals were housed collectively.

Test substance : The purity was listed as > = 90%.

Conclusion : The authors concluded that the material caused "slight, transient irritation" during the first hour.

Reliability : (2) valid with restrictions
Fewer animals than recommended (6) were used. The effect of washing eyes after treatment was not assessed.

(12)

5.3 SENSITIZATION

Type	:	other
Species	:	rabbit
Number of animals	:	6
Vehicle	:	
Result	:	not sensitizing
Classification	:	
Method	:	other
Year	:	1953

GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Result	:	No skin irritation was noted after 10 days of application of the material or after application of the challenge dose.
Test condition	:	Six rabbits (sex and weight were not listed) were treated dermally on clipped abdominal skin with 1.0 ml/kg test material, 5 days/week, 22 hours/day, for a total of 10 applications. The material was applied under rubber damming and gauze binders were placed around the abdomens to hold the damming in place. Each day, after 22 hours of treatment, the dressings were removed and the animals were observed for sys temic toxicity and skin irritation. Animals were then observed for toxicity for 10 additional days. A challenge dose was then applied to determine if the material caused sensitization.
Test substance	:	The purity was listed as > = 90%.
Reliability	:	(4) not assignable The study conduct is not up to current standards for sensitization studies.

(13)

5.4 REPEATED DOSE TOXICITY

Type	:	Sub-chronic
Species	:	rat
Sex	:	male
Strain	:	other: Carworth Farms albino
Route of admin.	:	oral feed
Exposure period	:	32 days
Frequency of treatm.	:	continuous
Post exposure period	:	
Doses	:	100, 1,000, 10,000 ppm
Control group	:	yes
Method	:	other
Year	:	1953
GLP	:	no
Test substance	:	as prescribed by 1.1 - 1.4
Remark	:	Based on the average amount of food consumed, the amount of test material consumed on a mg/day basis was 1.87, 18.23 and 169.31 mg/day for the 100, 1,000 and 10,000 ppm groups. Based on an average weight of 175.5, 174 and 167.5 g for rats treated with these concentrations (respect ively), the average amount of material consumed on a mg/kg/day basis was 10.7, 104.8 and 1010.8, respectively. The authors concluded that there was no evidence of toxicity at any dose level. The authors apparently did not think that the deaths at 100 and 10,000 ppm or the gross pathological changes in the liver and kidneys at 1,000 and 10,000 ppm were related to administration of test material. However, there is no explanation for this conclusion.
Result	:	Overall: Average body weights of animals treated with 100, 1,000 or 10,000 ppm were not significantly different from controls at any time point. Food consumption for all groups was erratic, but within normal limits. 10,000 ppm: One rat exposed to 10,000 ppm died after 20 days on the study. This animal exhibited labored respiration, a bloody nose, an unthrifty appearance and a weight loss of 20 grams at the end of the second week. An autopsy was not performed on this animal due to advanced autolysis. All other animals survived to termination. At terminal autopsy, 1 animal in this group had a granular liver and mottled, muddy-colored kidneys. Another rat had muddy-colored kidneys.

1,000 ppm: Two animals exhibited rough-surfaced kidneys upon terminal autopsy. One of these animals also had slight irritation of the intestines. A granular liver was noted in another rat treated with this dose.

100 ppm: One rat exposed to 100 ppm died after 17 days on the study. This animal exhibited an unthrifty appearance and a weight gain of 21 g at the end of the second week (average weight gain in the controls over 2 weeks was 51 g). An autopsy was not performed on this animal due to advanced autolysis. Gross pathology of animals surviving to necropsy was normal

Test condition : Four groups of 10 male rats each (100 - 130 g) were given 0, 100, 1,000 or 10,000 ppm of test material in the diet. They were individually housed and allowed free access to food and water. Body weight and food consumption were recorded weekly. Gross observations of the general appearance and behavior of each animal were made. The intervals at which these observations were made were not stated. All animals were euthanized after 32 days on the respective diets. At termination, 1 control and 3 animals from each of the other groups were killed by exsanguniation, gross autopsies were performed, and representative tissues (types were not stated except for the brain) were preserved for future histological examination. At the same time, one other control rat and the remaining experimental animals were killed by a blow on the head. Gross autopsies were performed on these animals, and representative tissues were preserved from the control animal only.

Test substance : The purity was listed as > = 90%.

Reliability : (4) not assignable
It is difficult to assign an NOAEL from this study. The conduct is not up to current standards. Organs were not examined histologically, and diets were not analytically tested for concentration of test material present, or stability or homogeneity of the test material. While the study does not appear to be invalid, it is not sufficient to fill the endpoint.

(13)

Type : Sub-acute
Species : Rabbit
Sex : no data
Strain : other:albino
Route of admin. : Dermal
Exposure period : 10 days
Frequency of treatm. : Daily
Post exposure period : 15 days
Doses : 1.0 ml/kg
Control group : no data specified
NOAEL : < 1 ml/kg bw
Method : other
Year : 1953
GLP : No
Test substance : as prescribed by 1.1 - 1.4

Result : None of the animals died. No skin irritation was noted after 10 days of application of the material or after application of the challenge dose. Five out of the 6 animals exhibited normal behavior and appearance and gained weight throughout the study. After 6 applications, one animal developed an apparent weakness or uncoordination of the hind extremities. This behavior persisted until study termination. Placement and righting reflexes in this animal were normal. This animal also developed diarrhea, weight loss, and an "unthrifty" appearance. There were no significant necropsy findings in any of the animals (including the animal with diarrhea).

Test condition : Six rabbits (sex and weight were not listed) were treated dermally on clipped abdominal skin with 1.0 ml/kg test material, 5 days/week, 22 hours/day, for a total of 10 applications. The material was applied under rubber damming and gauze binders were placed around the abdomens to

hold the damming in place. Each day, after 22 hours of treatment, the dressings were removed and the animals were observed for systemic toxicity and skin irritation. Animals were then observed for toxicity for 10 additional days. A challenge dose was then applied to determine if the material caused sensitization. The animals were euthanized 25 days after the first application and gross autopsies were performed. Tissues from representative were preserved (types were not stated) for future histologic examination. Animals were housed individually during the study and offered food and water ad lib.

Test substance : The purity was listed as > = 90%.

Reliability : (4) not assignable
This study has a reliability rating of 4 for repeated dose toxicity. It was not conducted similarly to current standards. Standard endpoints were not measured. Only one dose was tested.

(13)

5.5 GENETIC TOXICITY 'IN VITRO'

5.6 GENETIC TOXICITY 'IN VIVO'

5.7 CARCINOGENICITY

5.8.1 TOXICITY TO FERTILITY

5.8.2 DEVELOPMENTAL TOXICITY/TERATOGENICITY

5.8.3 TOXICITY TO REPRODUCTION, OTHER STUDIES

5.9 SPECIFIC INVESTIGATIONS

5.10 EXPOSURE EXPERIENCE

5.11 ADDITIONAL REMARKS

6.1 ANALYTICAL METHODS

6.2 DETECTION AND IDENTIFICATION

7.1 FUNCTION

7.2 EFFECTS ON ORGANISMS TO BE CONTROLLED

7.3 ORGANISMS TO BE PROTECTED

7.4 USER

7.5 RESISTANCE

8.1 METHODS HANDLING AND STORING

8.2 FIRE GUIDANCE

8.3 EMERGENCY MEASURES

8.4 POSSIB. OF RENDERING SUBST. HARMLESS

8.5 WASTE MANAGEMENT

8.6 SIDE-EFFECTS DETECTION

8.7 SUBSTANCE REGISTERED AS DANGEROUS FOR GROUND WATER

8.8 REACTIVITY TOWARDS CONTAINER MATERIAL

(1) Cuthbert JE and Mullee DM. 2003. 3,3'-thiodipropionitrile (CT-781-03): Determination of melting point/melting range and hydrolysis as a function of pH. SafePharm Laboratories (SPL) project number 971/210, dated September 24, 2003 (unpublished).

(2) Cytec Industries, Inc. 1997. Material safety data sheet for thiodipropionitrile, dated July 1.

(3) EPIWIN AOP (v1.90)

(4) EPIWIN ECOSAR

(5) EPIWIN Fugacity Level III Model

(6) EPIWIN Kowwin (v1.66)

(7) EPIWIN Mpbpwin (v 1.40).

(8) EPIWIN Wskow (v1.40)

(9) RTECS.2003. Registry of toxic effects of chemical substances.

(10) The Dow Chemical Company. 2001. Material safety data sheet for thiodipropionitrile dated December 3.

(11) Tremain SP. 2003. 3,3'-thiodipropionitrile (CT-781-03): Determination of vapour pressure. SafePharm Laboratories (SPL) project number 971/211, dated September 24, 2003 (unpublished).

(12) Tusing TW. 1953. Progress Report : B,B' Thiodipropionitrile Acute Oral and Dermal Toxicity and Acute Eye Irritation. Hazleton Laboratories Report to American Cyanamid Company, dated Feb. 24, 1953.

(13) Tusing TW. 1953. Progress Report : B,B' Thiodipropionitrile Repeated Dermal Application, Acute Inhalation Toxicity, and Subacute Feeding. Hazleton Laboratories Report to American Cyanamid Company, dated March 30, 1953.

10.1 END POINT SUMMARY

10.2 HAZARD SUMMARY

10.3 RISK ASSESSMENT